





First records of *Mesoplodon europaeus* (Gervais, 1855), Gervais' Beaked Whale (Cetacea, Ziphiidae, *Mesoplodon*), and other beaked whales in Suriname, South America


MARIJKE N. DE BOER^{1,2*}, MICHEL VAN DEN BERGH³, MONIQUE POOL⁴, TOMAS WILLEMS⁵

¹ Wageningen Marine Research – University of Wageningen, Den Helder, The Netherlands • Marijke.deboer@wur.nl

² Seven Seas Marine Consultancy, Amsterdam, The Netherlands • info@sevenseasmarine.nl  <https://orcid.org/0000-0002-7492-3057>

³ WWF Guianas, Paramaribo, Suriname • michieltvdbergh@gmail.com

⁴ Green Heritage Fund Suriname, Paramaribo, Suriname • monique@greenfundsuriname.org  <https://orcid.org/0000-0003-0120-3515>

⁵ Fisheries Department, Ministry of Minister of Agriculture, Animal Husbandry and Fisheries, Paramaribo, Suriname • tomaswillems@gmail.com  <https://orcid.org/0000-0003-1724-0441>

* Corresponding author

Abstract. A group of *Mesoplodon europaeus* (Gervais, 1885), Gervais' Beaked Whales, were recorded along the Demerara Plateau (Suriname) at depths of 2,300 and 2,700 m. These are the first records of the species within the Guiana Basin. The Demerara Plateau may well offer an important habitat for deep-diving beaked whales, but further research is needed. We emphasize that, in light of a recent increase in oil and gas exploitation activities, there is an urgency to develop effective regionally and nationally specific conservation measures for whales in Suriname.

Keywords. Cetacean, conservation, Demerara Plateau, Guiana basin, marine spatial planning, megafauna survey, wider Caribbean region

Academic editor: Mario Alberto Cozzuol

Received 25 October 2022, accepted 14 March 2023, published 23 March 2023

De Boer MN, van den Bergh M, Pool M, Willems T (2023) First records of *Mesoplodon europaeus* (Gervais, 1855), Gervais' Beaked Whale (Cetacea, Ziphiidae, *Mesoplodon*), and other beaked whales in Suriname, South America. Check List 19 (2): 209–214. <https://doi.org/10.15560/19.2.209>

Introduction

Beaked whales (family Ziphiidae) are among the least known of all mammalian groups comprising at least 23 species globally (Committee on Taxonomy 2020). Beaked whale species generally occur in deep offshore waters, and most information is gathered from stranded animals compared to only a few recorded high-quality observations of beaked whales sighted at sea (e.g., Bachara et al. 2018; Pitman et al. 2019; Rosso et al. 2020). All species of beaked whales are, therefore, incompletely described, and most knowledge regarding these species is based on examinations of a few stranded individuals (Hooker et al. 2019).

Mesoplodon europaeus (Gervais, 1885), Gervais' Beaked Whale, remains one of the lesser known of all

the beaked whale species (Shipley et al. 2016; Bachara et al. 2018; Zachos 2018). This is mainly due to the difficulty in both the detection and identification of *Mesoplodon* species in general. The distribution of *M. europaeus* is therefore also little known. It is believed to inhabit tropical and warm-temperate waters across the northern and central Atlantic Ocean. Most stranding records are from the western side of the North Atlantic, with the majority coming from the southwest North Atlantic (Jefferson et al. 2015). Because of the low number of *M. europaeus* sightings at sea, there are consequently only a few photographs or video materials available for this species (Shipley et al. 2016). The presence of *M. europaeus* remains uncertain for many countries that fall within the assumed geographical distribution (the tropical and warm temperate waters of the Atlantic

Ocean), including Suriname and the neighbouring countries of French Guiana and Guyana (Pitman and Brownell 2020).

Here we report on a sighting of a group of *M. europaeus* off Suriname, observed on the western flanks of the Demerara Plateau during a survey of megafauna in September 2021. This was the second of two offshore surveys carried out in 2021, which aimed to collect information on the distribution and occurrence off Suriname of marine megafauna (cetaceans, turtles, elasmobranchs, and avifauna). Both surveys were part of a Marine Spatial Planning project (2017–2021) and built further upon the cetacean study by De Boer (2015).

Methods

An 18 m long sailing catamaran (the SV *Guyavoile.973*) was used to conduct a 6-day marine megafauna survey (23–28 September 2021) along the continental shelf and the western flanks of the Demerara Plateau offshore Suriname (Fig. 1). The Demerara Plateau is a submarine continental relief which stretches for about 380 km along the coast and is about 250 km wide from the shelf-break (Reuber et al. 2016). The Plateau lies in relatively shallow waters of approximately 700 m, but in the northwest, the Plateau rapidly reaches depths of 3,000–4,500 m (Fig. 1). The vessel departed from the mouth of the Maroni River and concluded after six days in Paramaribo (Fig. 1). The observation team consisted of seven marine mammal observers. At all times, at least two experienced cetacean observers were on duty, and rotations were performed every hour. The observers scanned the sea predominately with the naked eye but used binoculars (7 × 50 and 10 × 42) to scan the horizon, aiding species identification and group-size estimations. Positive identification through obtaining

photographs of the sighted species was often necessary with distant sightings or difficult to identify species. Equipment included a Canon 80d camera with an EF 100–400 mm f/4.5–5.6L IS II USM lens and a Nikon D7500 camera with a AF 300 mm f/4 lens. A Sony A6400 video camera with a Tamron 28–75 mm F2.8 lens was also used. When an individual or a group of cetaceans was detected, the following sighting data was recorded: species identification to the lowest possible taxonomic level, school size, behaviour, radial distance, bearing and geographic position. When a sighting was made, the vessel would slow down, either by switching off the motor or lowering the sails and remain stationary to confirm species identification and to estimate group size. Environmental observations were also collected during the survey, including wind speed and direction (using the ship's wind meter), swell height and visibility (estimated by eye), and Beaufort sea state (BSS). A Garmin GPS (Garmin GPSMAP 78sc) was used for logging the ship's position every minute.

Results

Mesoplodon europaeus (Gervais, 1885)

Figures 2, 3

New records. SURINAME – Offshore • Demerara Plateau, western flank; 08°32'47.76"N, 054°45'21.99"W; 2300 m depth; 26.IX.2021; M. Pool, M.V. Bergh, T. Willems obs. • same locality; 08°32'48.32"N, 054°45'22.29"W; 2300 m depth, 26.IX.2021; Pool M, Bergh MV, Willems T obs.

At least two breaching beaked whales were sighted at a distance of 400 m from the catamaran at 16:13 local time. The breaching events occurred on two separate occasions involving 2 or 3 animals. The

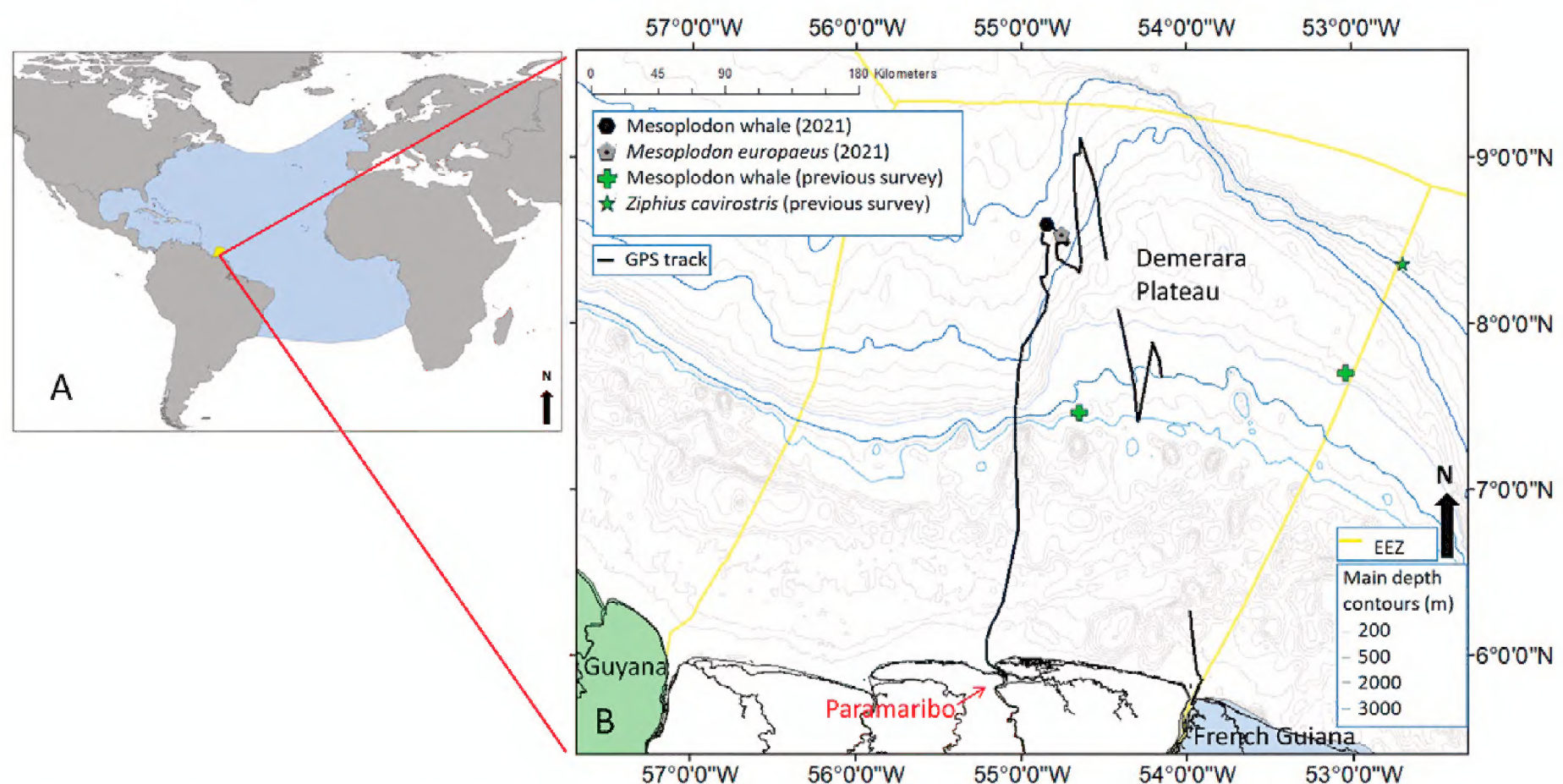


Figure 1. A. Presumed global distribution of *Mesoplodon europaeus*. **B.** Records of *M. europaeus* and other beaked whales in Suriname. Grey and black symbols are records reported in this study, green symbols show the positions of beaked whales recorded during previous surveys off Suriname. The locations of the Demerara Plateau and main bathymetric contours (in meters) are also shown. The Exclusive Economic Zone (EEZ) is outlined in yellow (200 nm offshore), and the vessel's GPS track is shown in black.



Figure 2. Photographic sequence of surfacing of *Mesoplodon europaeus*, Individual 1 (adult female or maturing male). **A.** The diagnostic dark stripe (see arrow) and overall body profile confirm that this is a Gervais' Beaked Whale. **B.** Lateral view (left side) and a relatively fresh bite from *Isistius brasiliensis* (Quoy & Gaimars, 1824), Cookie-cutter Shark, is evident (see arrow). **C.** Lateral view (right side). Photo credits: T. Willems.

sailing catamaran slowly approached the place where the whales were last seen breaching and then remained stationary. At 16:16, one of the whales (Individual 1) surfaced at a distance of 200 to 300 m from the vessel and several photographs were made. The whales were loosely grouped, surfacing at some distance from each other and conducting directional changes. At 16:18, they arched their tailstocks at a shallow angle and dived. The whales stayed submerged for 13 minutes, during which the catamaran remained drifting. At 16:34, an adult male (Individual 2) surfaced at a distance of 100 to 150 m from the vessel. Both video and photographs were taken of this encounter. The whale surfaced up to 7 times, slowly moving away from the

vessel before it steeply arched its tailstock and dived at 16:35. The whales did not re-surface, and the survey was resumed at 17:00 with the vessel continuing to travel in a north-western direction.

Identification. The general body length (4–5 m) and profile of the whales was similar to the typical shape of *Mesoplodon* species (Fig. 2). Individual 1 was brown-grey overall, showing some old, rounded scars and one fresh scar, most likely caused by a *Isistius brasiliensis* (Fig. 2B). The photographs revealed that the whale had a dark dorsal band which is diagnostic for *M. europaeus*, but that the vertical striping that is often evident in this species is not visible. We assume that the animal was

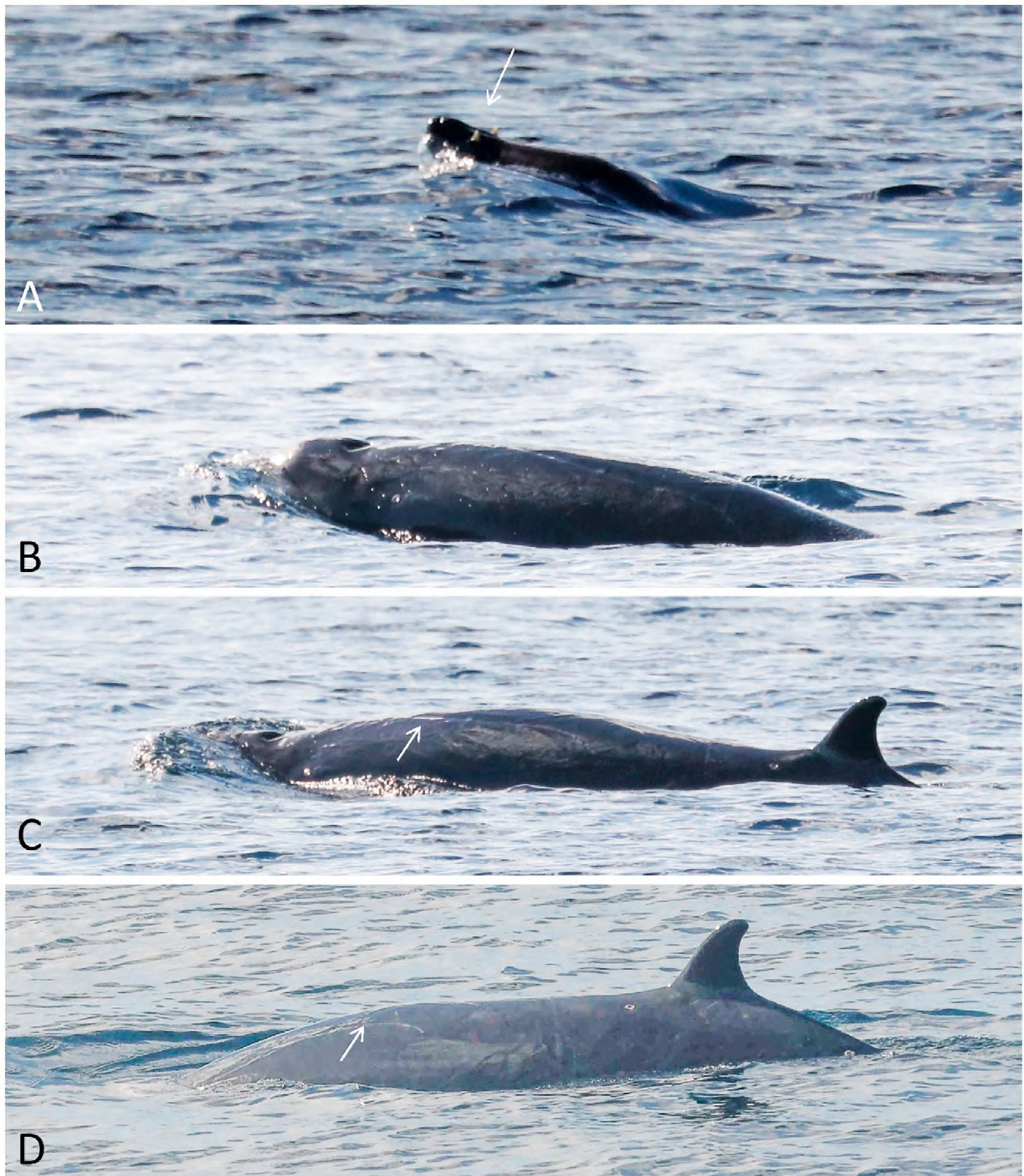


Figure 3. Photographic sequence of surfacing of *Mesoplodon europaeus*, Individual 2. **A.** Position of the teeth (see arrow). **C, D.** Presence of elongated scars. Photo credits: M. van den Bergh and T. Willems (D).

an adult female or maturing male *M. europaeus*, as there were no evident elongated scarring or erupting teeth visible (characteristics associated only with mature males; Jefferson et al. 2015).

The photographs revealed that Individual 2 had the general profile and typical shape of a *Mesoplodon* species and had conspicuous teeth about one-third of the way back from the tip of the beak (Fig. 3A). The similar *Mesoplodon mirus* (True, 1913), True's Beaked Whale, has teeth which are located at the tip of the beak, whereas *Mesoplodon densirostris* (Blainville, 1817) Blainville's

Beaked Whale, has teeth that are located about halfway back from the tip of the beak and are strongly elevated (e.g. Jefferson et al. 2015). It is further evident that this adult male *M. europaeus* also displayed fresh tooth rake marks along the back of the body (Fig. 3C, D).

Discussion

This note reports the first record of *Mesoplodon europaeus*, Gervais' Beaked Whale, in the waters of Suriname. During the present survey, on the same day at 18:08, one unidentified beaked whale (Individual 3) was

observed at a distance of about 200 m from the vessel at 08°36'14.85"N, 054°51'0.67"W in waters with a depth of 2,700 m. The whale was surfacing slowly and was only briefly seen. Individual 3 had the general body profile similar to the typical shape of *Mesoplodon* species (Fig. 4). It had a paler forward body, but with fading day-light, it was not possible to obtain clear photographs to allow identification to species level. Only three previous beaked whale records are known for Suriname waters. Two of these sightings were reported during an aerial survey, of which one was identified as *Ziphius cavirostris* (Cuvier, 1823), Cuvier's Beaked Whale (Ridoux et al. 2010). Another unidentified *Mesoplodon* species was recorded in shelf waters in 2015 and involved an adult male (due to the presence of elongated scarring (J.T. Saulino pers. obs.).

Mesoplodon europaeus has also not been reported in the Guianas, neighbouring Guyana and French Guiana (Pusineri et al. 2021). However, during aerial surveys, *Ziphius cavirostris* have been reported on three occasions in September–October (Ridoux et al. 2010). The nearest record of *M. europaeus* is a stranded specimen from Brazil's north-eastern coast (Martins et al. 2004). *Mesoplodon europaeus* are the most frequently stranded *Mesoplodon* species along the Atlantic coast of the United States (Mead 1989), and it is also known from the Caribbean, with confirmed records from the Bahamas (Claridge et al. 2015; Shipley et al. 2016), Jamaica, Barbados, St. Vincent, Puerto Rico, the Virgin Islands, Cuba, Dominica, Trinidad, Curaçao, Bonaire (Mignucci-Giannoni 1989), the Dominican Republic (Toyos-Gonzales et al. 2000), and the Gulf of Mexico in the Yucatan region (Debrot and Barros 1994; Solis-Ramirez 1995). There are also reports that the species has probably been caught in Caribbean small cetacean fisheries (Jefferson et al. 1993).

The little-explored steep edges of the Demerara Plateau may well offer an important habitat for deep-diving beaked whales, such as *M. europaeus*, but further research is needed to study the habitat-use of these elusive beaked whales. This is especially important in the light of the recent increase in oil and gas exploitation activities within Suriname and elsewhere within the

Guiana Basin (Guyana and French Guiana), and these activities have been identified as a threat to key biodiversity areas in French Guiana (Pusineri et al. 2021). We emphasize that more systematic at-sea surveys, photo-identification, and behavioural studies are needed to assess the status of all cetaceans and to develop effective regionally and nationally specific conservation measures, not only in Suriname waters but within the Guiana Basin as a whole. We also recommend that all research activities in this area report their marine megafaunal records, in order to gain a better understanding about the occurrence, distribution, and ecology of beaked whales within the Guiana Basin.

Acknowledgements

We thank Captain Gaëtan Benis and his crew for their assistance and support and all observers involved in the offshore expeditions. We further thank H. Verdaat and R.L. Pittman for positively identifying animals and providing information on species. We also thank Skolid Muntslag for the video material. The Ocean Expeditions were carried out under the European Union-funded project Promoting Integrated and Participatory Ocean Governance in Guyana and Suriname: the Eastern Gate to the Caribbean. We are thankful to the reviewers who greatly helped to enrich this publication.

Author Contributions

Conceptualization: MDB. Data curation: MDB. Funding acquisition: MP. Methodology: MDB. Methodology: MP. Validation: MDB. Visualization: MVDB, TW. Writing – original draft: MDB. Writing – review and editing: MDB, MVDB, MP, TW.

References

- Bachara W, Berrow S, López Suárez P, Dias D, Ratão, SS (2018) Stranding and sighting records of Gervais' beaked whale in Cabo Verde. *Zoologia Caboverdiana* 7: 19–21.
- Claridge D, Ylitalo G, Herman D, Durban J, Parsons K, Dunn CA (2015) Behavioral ecology of deep-diving odontocetes in The Bahamas. Environmental Research and Development Program (SERDP), Alexandria, VA 22350, USA, 127 pp. <https://apps.dtic.mil/sti/pdfs/AD1030952.pdf>. Accessed on 2022-10-10.
- Committee on Taxonomy (2020) <https://marinemammal-science.org/science-and-publications/list-marine-mammal-species-subspecies/>. Society for Marine Mammalogy, Lawrence, USA. Accessed on 2022-10-10.
- De Boer MN (2015) Cetaceans observed in Suriname and adjacent waters. *Latin American Journal of Aquatic Mammals* 10 (1): 2–19. <https://doi.org/10.5597/lajam00189>
- Debrot AO, Barros NB (1994) Additional cetacean records for the Leeward Dutch Antilles. *Marine Mammal Science* 10: 359–368.
- Hooker SK, De Soto NA, Baird RW, Carroll EL, Claridge D, Feyrer L, Miller PJO, Onoufriou A, Schorr G, Siegal E, Whitehead H (2019) Future directions in research



Figure 4. Photographic sequence of surfacing of whale, Individual 3. **A, B.** The general body profile is similar to the typical shape of *Mesoplodon* species. Photo credits: T. Willems (A) and M. van den Bergh (B).

- on beaked whales. *Frontiers in Marine Science* 5: 514. <https://doi.org/10.3389/fmars.2018.00514>
- Jefferson TA, Leatherwood S, Webber MA** (1993) FAO species identification guide. Marine mammals of the world. Food and Agriculture Organization, Rome, Italy, 320 pp.
- Jefferson TA, Webber MA, Pitman RL** (2015) Marine mammals of the world: a comprehensive guide to their identification, 2nd edition. Academic Press, London, UK, 617 pp.
- Martins AMA, Alves TT, Furtado Neto MAA, Lien J** (2004) The most northern record of Gervais' beaked whale *Mesoplodon europaeus* for the southern hemisphere. *Latin American Journal of Aquatic Mammals* 3 (2): 151–155.
- Mead JG** (1989) Beaked whales of the genus *Mesoplodon*. In: Ridgway SH, Harrison R (Eds.) *Handbook of marine mammals, volume 4: river dolphins and the larger toothed whales*. Academic Press, Cambridge, USA, 349–430.
- Mignucci-Giannoni AA** (1989) Zoogeography of marine mammals in Puerto Rico and the Virgin Islands. MSc thesis, University of Rhode Island, South Kingstown, USA, 229 pp.
- Pitman RL, Brownell Jr RL** (2020) *Mesoplodon europaeus*. In: The International Union for Conservation of Nature's Red List of Threatened Species. <https://doi.org/10.2305/iucn.uk.2020-3.rlts.t13245a50365198.en>. Accessed on: 2022-11-27.
- Pitman RL, Totterdell J, Wellard R, Cullen P, De Boer MN** (2019) Long in the tooth: biological observations from at-sea sightings of strap-toothed beaked whales (*Mesoplodon layardii*). *Marine Mammal Science* 35 (3): 1141–1161. <https://doi.org/10.1111/mms.12575>.
- Pusineri C, Martinez L, Bordin A de Montgolfier B, Deffes O, Rufray V, Lenrume P, Safi M, Suardi A, Wyss V, Gerardes D, Marzeliere M, Leclerc B, Barnicoat S, Rinaldi R** (2021) Cetacean community off French Guiana. *Latin American Journal of Aquatic Mammals* 16: 1–11. <https://doi.org/10.5597/lajam00266>
- Reuber KR, Pindell P, Horn, BW** (2016) Demerara Rise, offshore Suriname: magma-rich segment of the Central Atlantic Ocean, and conjugate to the Bahamas hot spot. *Interpretation* 4 (2): T141–T155. <https://doi.org/10.1190/INT-2014-0246.1>
- Ridoux V, Certain G, Doremus G, Laran S, van Canneyt O, Watremez P** (2010) Mapping diversity and relative density of cetaceans and other pelagic megafauna across the tropics: general design and progress of the REMMOA aerial surveys conducted in the French EEZ and adjacent waters. In: *Proceedings of the 62nd Annual Meeting of the International Whaling Commission*, Agadir, Morocco, 1–13.
- Rosso M, Lin M, Caruso F, Liu M, Dong L, Borroni A, Lin W, Tang X, Bocconcelli A, Li S** (2020) First live sighting of Deraniyagala's Beaked Whale (*Mesoplodon hotaula*) or Ginkgo-toothed Beaked Whale (*M. ginkgodens*) in the western Pacific (South China Sea) with preliminary data on colouration, natural markings, and surfacing patterns. *Integrative Zoology* 16 (4): 451–461. <https://doi.org/10.1111/1749-4877.12507>
- Shipley ON, O'Shea OR, Brooks EJ, Zuckerman ZC** (2016) Sighting of three female Gervais' Beaked Whales (*Mesoplodon europaeus*) from the Exuma Sound, Bahamas. *Caribbean Naturalist* 32: 1–4.
- Solis-Ramirez MJ** (1995) Un caso de varamiento de *Mesoplodon europaeus* Gervais, 1855 (Mammalia-Cetacea) en Playas de cheism, Yucatan, Mexico. *Jana* 6 (3): 12–13.
- Toyos-Gonzales GM, Bonnelly de Calventi I, Vega-Guerra MB, Pugibet-Bobea E, Ramirez H, Mignucci-Giannoni AA** (2000) Cetacean strandings in the Dominican Republic. In: *Proceedings of the XIII Biennial Conference on the Biology of Marine Mammals*. Wailea, Maui, Hawaii, 187.
- Zachos E** (2018) Exclusive: rare, mysterious whale filmed professionally for the first time—this is what Gervais' Beaked Whales look like from above. *National Geographic*, Washington DC, USA. <https://www.nationalgeographic.com/animals/article/beaked-whale-drone-photography-first-sp.> Accessed on 2022-10-10.